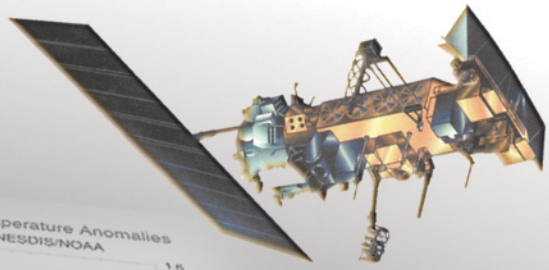
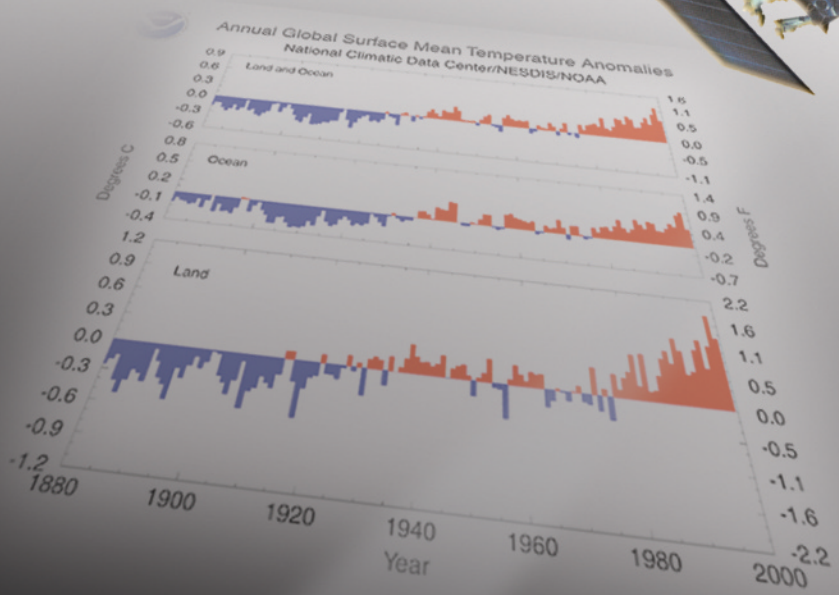
NOAA Satellite and Information Services

National Environmental Satellite, Data, and Information Service





NESDIS 2002 ANNUAL REPORT

Building on a Past

Honoring the Heritage of the National Environmental Satellite, Data, & Information Service

Serving America Today

Gold Awards

Ensuring a Future

Leadership Competencies Development Program

As we move into 2003, it is appropriate that we look back at 2002 and acknowledge the events of the past year and the good work that NESDIS employees are doing for the nation.

Over the past year, I have been proud of our employees' achievements that led to satellite service continuity and improvement of data access and services for the nation. On June 24th, we launched our latest polar-orbiting operational environmental satellite NOAA-M, which was renamed NOAA-17 upon launch. Our Office of Satellite Operations maintained a 99.9 percent rate of recovery of data from our polar-orbiting, defense, and geostationary spacecraft. We also created new and improved products, including the provision of critical imagery to government agencies battling wildfires in the Western U.S. Our Data Centers continued a tradition of excellence, increasing by more than 50 percent the amount of data downloaded by customers through the internet and increasing the amount of real-time data ingested. Through our Climate Database Modernization program, we were able to add eight million records for public access.

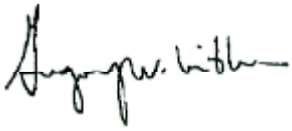
Gregory Withee
Assistant Administrator for Satellite & Information Services

In 2002, we also saw several key events that will greatly impact the future of NESDIS. In August, the Air Force awarded a contract to TRW, Inc. (Northrop Grumman Corp.) worth up to $4.5 billion for the National Polar-orbiting Operational Environmental Satellite System (NPOESS). A tri-agency program with the Department of Defense and NASA, NPOESS is the integration of civil and military environmental satellite programs into one system that will significantly improve weather forecasting and climate assessments while saving taxpayers money.

Our work here in NESDIS not only has benefits within the U.S., but has repercussions beyond our borders. NOAA supported humanitarian relief in Afghanistan by expanding access to climate products, providing specialized satellite products to assist relief agencies, and by helping re-establish the Afghanistan Climate Service by providing paper copies of unclassified weather records. This past year NOAA signed a bilateral agreement with Japan to back up its failing geostationary satellite with a U.S. GOES in order to maintain Pacific geostationary satellite coverage for Japan, the U.S. and our allies. The 20th Anniversary of the Cospas-SARSAT international search-and-rescue program occurred. To date, more than 14,000 lives have been saved.

Under the leadership of the NOAA Administrator VADM Conrad C. Lautenbacher, USN (ret.), we have been involved in a NOAA-wide program review, looking at all aspects of how we work internally and how we engage externally. We are involved in creating a new observation architecture, which will truly embrace the integration of *in situ* and satellite data to provide better products for users. NOAA is also developing a new strategic plan. I know that these efforts will make both NOAA and NESDIS better integrated, more focused and better positioned to offer our users and customers improved products and services.

Sincerely,



NESDIS MISSION: To provide and ensure timely access to global environmental data and information services from satellites and other sources to promote, protect and enhance the Nation's economy, security, environment and quality of life.

NESDIS VISION: To be the source for the world's most comprehensive and easily accessible satellite products, environmental information, and assessments of the environment.

INTRODUCTION

The environmental data and imagery available from NOAA's Satellite and Information Service, NESDIS, has never been more essential to enhancing public safety and understanding our environment. Tornadoes, hurricanes and floods average $11.4 billion in damage in the United States. Drought is estimated to result in average annual losses to all sectors of the U.S. economy of between $6 billion and $8 billion.

From the satellite imagery of hurricanes seen on television weathercasts to official climate data accessible on the Internet, NESDIS products, services and research offered reliable environmental information to decision makers in government, industry and academia.

In 2002, NESDIS continued a tradition of monitoring our environment and ensuring public access to data from the surface of the sun to the depths of the oceans. NESDIS products and services were critical to accomplishing the mission of the agency by:

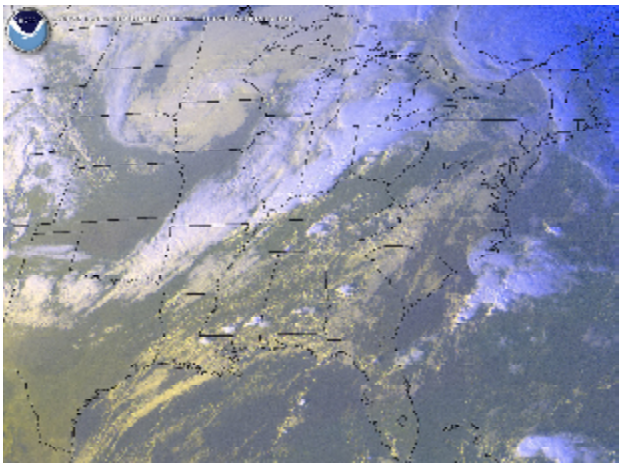
This Annual Report highlights key achievements in 2002 that resulted in numerous economic, environmental and security benefits to the nation.

I. IMPROVING WEATHER PRODUCTS AND SERVICES

GOES Images Signal Severe Weather

Hours in advance of one of the worst U.S. tornado outbreaks on record on Sunday, November 10, NESDIS scientists activated the rapid-scan mode on the Geostationary Operational Environmental Satellite (GOES) 8.

This doubled the frequency of GOES scans of the U.S., taking a scan of the entire country in 7.5 minutes, instead of the normal 15. NOAA forecasters at the Storm Prediction Center used the fast imagery updates to issue accurate tornado watches in advance of massive thunderstorms that spawned approximately 88 twisters. The tornadoes

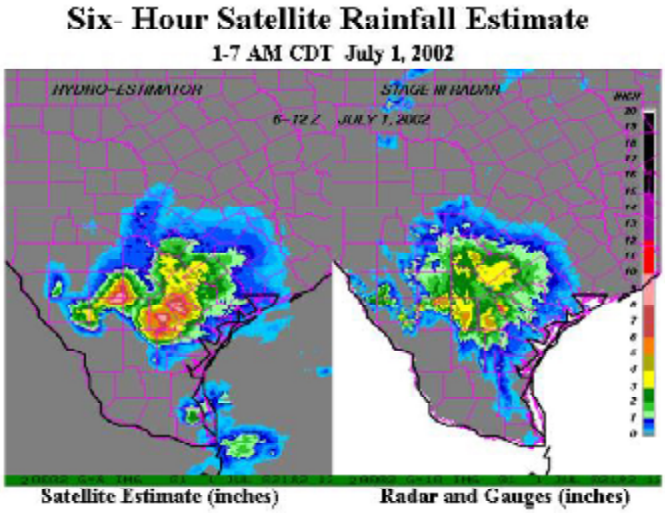


NESDIS scientists saw overshooting tops and squall lines, vital clues for forecasters.

severely damaged several factories and numerous other businesses and destroyed hundreds of homes over a seven-state area from Pennsylvania to Mississippi, according to the November 12, 2002, New York Times. In addition, NOAA satellite imagery on local television weather casts helped save lives by showing the developing thunderstorms with tornadic potential.

Satellite Analysis Branch Accurately Estimates Heavy Rains

At least seven consecutive days of rainfall occurred over South and Central Texas from June 28 to July 5, 2002. The NESDIS Satellite Analysis Branch provided satellite rainfall estimates for 100 continuous hours. These NESDIS scientists support disaster mitigation and warning services for all federal agencies and the international community with satellite analysis products.



The NESDIS hydro-estimator product accurately projected short-term (6-hour) rainfall magnitudes and patterns. When compared with rain gauges, the hydro-estimator depicted the cores of extremely heavy rainfall occurring during the period.

This laptop was displaying the 42kb water vapor JPEG image that was downloaded to the aircraft in real-time during a P-3 flight into Tropical Storm Hanna on September 13, 2002. The image downloaded in about two minutes.

Satellite Imagery for Hurricane Research Jets

NESDIS enhanced the value of NOAA hurricane research aircraft in 2002 by making real-time images available on board the aircraft. Considerable progress was made on the development and testing of data compression software, which squeezes the large volume of imagery data into a form that scientists can download easily in flight. Sample imagery was obtained from recent tropical cyclones, and several compression methods were evaluated. NESDIS scientists have established a foundation to make GOES data routinely available on flights during the 2003 hurricane season.

Humanitarian Relief for Afghanistan

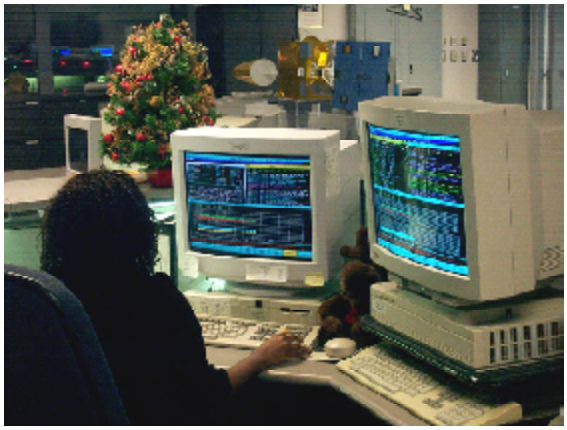
At the request of the U.S. State Department, NOAA has been disseminating environmental information to assist the humanitarian relief effort in Afghanistan. On an internet web site, NESDIS posted a special snow cover map derived from Advanced Microwave Sounder Units (AMSU) on board NOAA polar orbiting satellites. The web page updates as soon as NOAA-15 or NOAA-16 passes over the region.

The National Climatic Data Center has completed a web system describing the climatology and providing data access for Afghanistan and surrounding countries. The key part is an interactive map, developed with assistance from the U.S. Air Force and U.S. Navy. NCDC also developed a corollary CD-ROM product which, makes much of the information available to users in the field who lack Internet access.

Http://lwf.ncdc.noaa.gov/oa/climate/research/afghan/afghan2.htm

NOAA Assists Japan with Satellite Coverage

On May 10, Vice Admiral Conrad C. Lautenbacher, Jr., U.S. Navy (Ret.) Undersecretary of Commerce for Oceans and Atmosphere and NOAA Administrator, signed an agreement with the Japan Meteorological Agency (JMA) to back up GMS-5, an ailing geostationary satellite belonging to that agency. For the backup, NOAA brought GOES-9 out of storage mode on December 11. Although GOES-9 no longer meets U.S. forecasting requirements, it does have sounding and limited imaging capabilities comparable to that of the GMS-5.



This controller is working with GOES-9 in the NESDIS Satellite Operations and Control Center in Suitland, Maryland on December 24, 2002.

JMA agreed to provide funding to upgrade the Fairbanks, Alaska, Command and Data Acquisition Station and to cover the new operating costs during the length of the agreement. The arrangement also lays the groundwork for a separate long-term mutual backup agreement, which would enable the U.S. to call upon Japan if the circumstances were reversed. GOES-9 was expected to be in place at 155 degrees East by April of 2003.

Successful Launch of a New Polar Satellite

NOAA-M was launched June 24, and was renamed NOAA-17 after achieving orbit. It is the third in a series of polar-orbiting environmental satellites (POES) with improved imaging and sounding capabilities that will contribute to the goals of the President's climate change research initiatives. NOAA-17 has a Solar Backscatter Ultraviolet Radiometer (SBUV/2). Both an imager and a sounder, the SBUV/2 produces total ozone maps and measures the ozone distribution in the atmosphere as a function of altitude. In the past, it has not flown on the morning POES, but the new 10:00 a.m. orbit permits the collection of ozone data.

Polar-orbiting NOAA-M was launched June 24, and renamed NOAA-17.

Heading Towards a New Generation of Polar Satellites

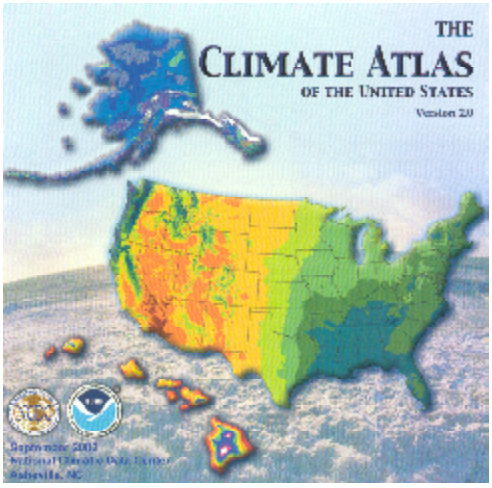
In August, a $4.5 billion contract was awarded to TRW Inc. of Redondo Beach, California, for the acquisitions and operations phases of the National Polar-orbiting Operational Environmental Satellite System (NPOESS). In December, TRW became a wholly-owned subsidiary of Northrop Grumman Corp. NPOESS combines the nation's military and civilian environmental satellite programs into a single national system that will significantly improve weather forecasting and climate prediction. In addition, NPOESS will provide global coverage of meteorological conditions for civil, military, and scientific purposes while cutting operational costs dramatically.

Mobile command station and portable field terminal are demonstrated at the NPOESS Maxi Review.

II. Extending Climate Services

NESDIS Assists in North American Drought Monitoring

An April 2002 workshop at NOAA's National Climate Data Center ushered in a new era of continental scale drought monitoring as drought experts from Canada and Mexico met with NOAA scientists in Asheville, North Carolina. The workshop resulted in a three-nation monitoring team to conduct an annual assessment of the North American continent's drought. An experimental map of drought conditions was first produced in December. The team's scientists plan to continue experimental monthly drought monitoring in 2003 with a goal to transition to an operational, publicly available North American Drought Monitor map later in 2003.



New Version of Climate Atlas on CD

The National Climate Data Center CD-ROM published Version 2.0 of the Climate Atlas of the United States in 2002, featuring 2,023 color maps of all 50 states. The CD replaces the paper copy of that document, last published in 1968. Version 2.0 also supercedes the CD-ROM that was published in 2000 and displayed maps for the contiguous states only. Individual station data for 7,700 locations used to produce the new atlas version are included on the CD, along with detailed documentation of the data sets used to generate the maps.

http://www.ncdc.noaa.gov/oa/about/cdrom/climatls1/atlashelp.html

Growth of Climate Database Modernization Program

In 2002, the Climate Database Modernization Program (CDMP) added an additional eight million records to its online system known as Web, Search, Store, Retrieve, Display, or WSSRD. As the year ended, the system held more than 36 million climate records. Hourly, upper air and ionospheric observations are among the records, as well as ice thickness reports.

Climate Reference Network Expands

By the end of December, the Climate Reference Network (CRN) included 27 stations in operation throughout the U.S., nearly triple the total from the previous year. Among the new stations were the first two deployed in Alaska, at Fairbanks and Point Barrow. The Point Barrow station survived an actual polar bear hug. The instruments kept functioning – and within calibration limits. The stations are designed to withstand visits by wild animals, especially deer.

CRN is designed to provide long-term high-quality observations of surface air temperature and precipitation. Current station equipment includes three platinum resistance thermistors in separate housings, which function as very high-grade inter-comparison thermometers. Other equipment includes a heated, weighing-bucket rain gauge; a pyranometer for measuring solar radiation; a ground-staring infrared radiation sensor is used for satellite inter-comparisons; and a precision anemometer measures wind velocity and run. Run is the sum of the wind velocity over a measured amount of time — not to be confused with average wind speed..

When complete, the CRN system will reduce scientific uncertainties in temperature and precipitation measurements nationally by providing highly accurate, consistent environmental measurements. Once a year, CRN sensors at each site are calibrated to National Institute of Standards and Technology (NIST) standards. Each station transmits data to the National Climatic Data Center via GOES every hour for final quality control and archiving.

http://lwf.ncdc.noaa.gov/img/climate/research/crn/lgintro.gif

Release of GDCN Dataset

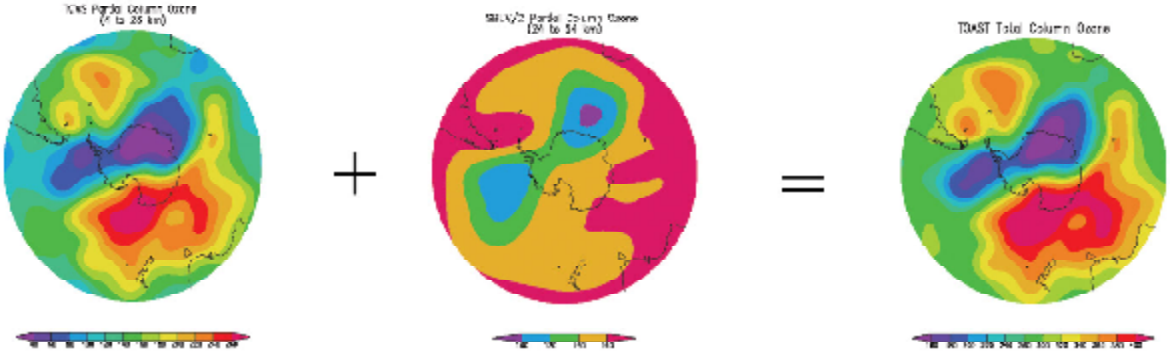
The Global Daily Climatology Network (GDCN) Global Daily Data Set was released in July. It represents a multiyear effort of collecting, analyzing, and archiving daily weather data over the globe into a single data set. From determining length of growing season to predicting the chance of extreme weather events, the data has many uses. The set contains daily temperature and precipitation measurements. It fills a niche for those who need to access daily data in a single consistent format. Previously, constituents with an interest in daily data were forced to search multiple data sets and often perform many of the preprocessing tasks necessary for a high-quality product. GDCN gives the user access to weather data from stations located across the world. Nearly 15,000 temperature stations and nearly 35,000 precipitation stations are included.

A web site contains up to date information on the latest version of the GDCN, data set summary maps, quality control enhancements, error reports, supplementary files, and frequently asked questions.

http://www.ncdc.noaa.gov/oa/climate/research/gdcn.html

1971-2000 Climate Normals Released

The climate normals, for 1971-2000, were also released. The newly computed daily climate normals are available on the NCDC Web site and on CD-ROM. A “climate normal” is the average of a climate element over 30 years. Currently, Climate Normals are calculated every 10 years retrospectively from the most recent 30 years of climate records. Normals are the average values of meteorological elements and associated indices such as heating and cooling degree days. Climate normal users include the energy and construction industries.



A TOAST map (along with its TOVS and SBUV/2 components) of the September 25, 2002 ozone hole is displayed

http://lwf.ncdc.noaa.gov/oa/climate/normals/usnormals.html

Arctic Ozone Hole Monitored

NESDIS scientists developed a new calculation tool to display the unusual 2002 split in the Antarctic Ozone Hole for September 25 on a map. A comparison with the 2001 ozone hole shows that the 2002 hole reached only about half the size.

The new calculation tool was a real-time total ozone retrieval algorithm. This algorithm combines the TirosN Operational Vertical Sounder (TOVS) low level layer ozone (4 to 23 kilometers) and the SBUV/2 upper level layer ozone (24 to 54 kilometers). The combined product, TOAST (Total Ozone Analysis using SBUV/2 and TOVS), is available at high spatial resolution globally.

TOAST is unique because it provides reliable ozone estimates over the polar regions during polar night (24-hour winter darkness). This is possible because of TOVS capability to measure in the infrared where ozone has an absorption feature at 9.7 microns.

http://orbitnet.nesdis.noaa.gov/crad/toast/toast.html

III. IMPROVING COASTAL SERVICES

NOAA's Coral Reef Information System (CoRIS) On Line

On September 27, 2002, NOAA unveiled a new internet site (www.coris.noaa.gov) designed to be a single point of access for comprehensive information on coral reefs worldwide, replacing an array of more than 50 separate Web sites. The Coral Reef Information System, known as CoRIS, also points to recent on-line publications including the September 2002 Report to Congress: A National Coral Reef Action Strategy and The State of Coral Reef Ecosystems of the United States and Pacific Freely Associated States: 2002. By the end of November, 2002, the CoRIS web site had attracted more

Records Available In CoRIS:

U.S. Coastal bathymetry	36
Coastal aerial photographs	4,279
Nautical chart images	397
Benthic habitat aerial photo mosaics	24
AVHRR products	2,660*
Tide data	867
Paleoclimate data from corals	87
Coral bleaching reports	12
Total	8,362
Library resources	598

*AVHRR is Advanced Very High Resolution Radiometer

than 14,000 visitors.

Coastal Data Development Center Opens

On April 8, 2002, the National Coastal Data Development Center (NCDDC) opened to the public at Stennis Space Center in Mississippi. NCDDC has a mandate to provide unique access to coastal data, along with archiving capabilities.

Depicts habitat data layers pertaining to the Gulf of Mexico region that are accessible through the NCDDC Habitat Program website. All of these data layers are accessible through the website, and can be mapped using the ArcIMS mapping capability provided for by the site. ArcIMS is an internet mapping software system from Environmental Systems Research Institute, Inc. (ESRI).

Even before opening, NCDDC had established partnerships with universities, and marine departments within various states. The partners are now connected to a national data network and are supported by NCDDC for data search and geospatial display as well as metadata construction. (Metadata is information about the data.)

Two major data center efforts are the Gulf of Mexico Habitat Pilot Project and the Coastal Risk Atlas.

The Habitat Pilot Project is designed to improve the NOAA's Marine Fisheries Service's capability to access and map fish habitat data in the Gulf of Mexico region, and to expand to other regions nationally. To augment this project, NCDDC has developed a habitat website www.ncddc.noaa.gov/fisheries for use by coastal resource managers, scientists, educators, non-governmental organizations and students. The website will allow users to access Gulf of Mexico fishery and habitat data for use in ecosystem-based fishery science and managing, as well as for mapping fish habitat.

Implemented for use by the Mississippi Gulf Coast and Northeast Florida areas during 2002, the Coastal Risk Atlas (CRA) is a joint project of (NCDDC) and the NOAA Coastal Services Center (CSC). The CRA will ultimately deliver an on-line risk/vulnerability atlas for the entire coastal U.S. including information such as the location of critical facilities, infrastructure and sources of potential toxic release. Coastal communities will be able to assess hazards unique to the coastal zone including tropical storm surges, winds and flooding. NCDDC plans to expand this capability to the remainder of the Gulf Coast during 2003.

Coast Watch Expands Products On Line

In June 2002, CoastWatch started routine posting of new near real time products on the web site http://coastwatch.noaa.gov/interface/interface.html including ocean color (Chlorophyll-a concentration) and sea surface temperature (SST). The SST data originate from NOAA's GOES and POES satellites and NASA's MODIS (Moderate Resolution Imaging Spectroradiometer) instrument on its polar orbiting Terra satellite. Ocean color data also came from MODIS. The products can be used for environmental monitoring and forecasting.

IV. PROVIDING OPERATIONAL OCEAN SERVICES

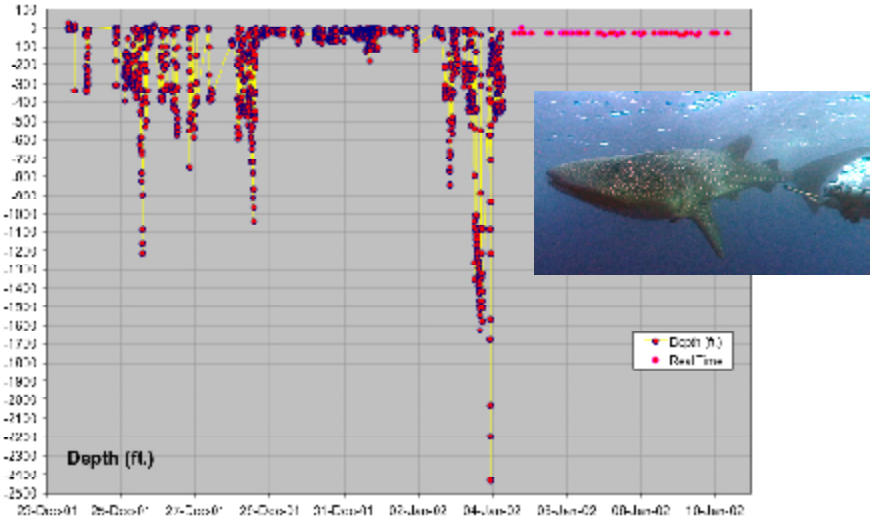
World Ocean Atlas On Line

A milestone in the electronic evolution of the World Ocean Atlas occurred in 2002. The World Ocean Database 2001 (WOD'01) became available online at http://www.nodc.noaa.gov/OC5/WOD01/pr_wod01.html as well as on CD-ROM. WOD'01 expands upon and updates the 1998 edition. Scientists can use this new product to compare the accuracy of oceanic measurements, and to obtain a baseline climatology for ocean climate change research.

WOD'01 contains new variables, data types (chemical, physical, and biological parameters), and additional historical as well as modern observations. The data include observations from the World Ocean Circulation Experiment (WOCE).

In addition, NOAA's Ocean Climate Laboratory produced the World Ocean Atlas 2001 (WOA01), which contains statistics and objectively analyzed fields generated from WOD'01 data. The ocean variables included in the atlas are: in-situ temperature, salinity, dissolved oxygen, apparent oxygen utilization, percent oxygen saturation, dissolved inorganic nutrients, (phosphate, nitrate and silicate), chlorophyll at standard depth levels; and plankton biomass sampled from the surface to 200 meters down. New variables include carbon dioxide partial pressure (pCO2) and total inorganic carbon (TCO2).

TAGGED WHALE SHARK, UTILA, HONDURAS
COURTESY OF SHARK RESEARCH INSTITUTE



Whale shark diving depth 23 Dec 01 to 10 Jan 02.

Satellite Tracking of Endangered Species

In 2002, the Argos satellite data collection relay system monitored approximately 2,400 different animals- including marine animals, land animals, and birds. Animal tracking is the fastest-growing application of the Argos system. The Argos data collection system is administered under a joint agreement between NOAA and the French space agency, Centre National d'Etudes Spatiales (CNES). The Argos instrument on NOAA polar orbiting satellites tracks the movement of transmitters which are attached to animals such as sharks and turtles. Data are collected at the NESDIS ground stations as well as in Lannion, France, and are processed by NESDIS. Two CNES subsidiary companies process the data and deliver it to end users.

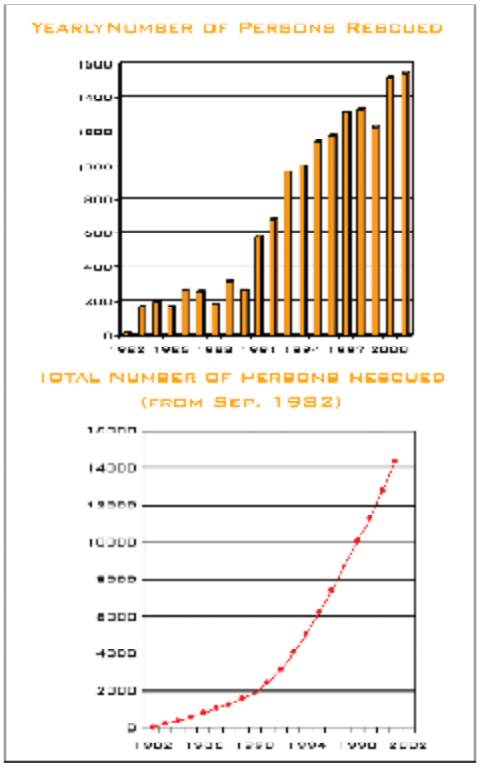
http://noaasis.noaa.gov/ARGOS/

Readers of the NESDIS 2001 Annual Report may remember this photo of a whale shark being tagged in December, 2001. In 2002, the Shark Research Institute learned location and temperature from that particular creature's travels, showing the animals's range (see above).

V. SAVING LIVES AND PROPERTY THROUGH HAZARD SUPPORT

20 Years of Life Saving Service from Cospas-Sarsat

Cospas-Sarsat, the international satellite-aided search and rescue program, celebrated its twentieth anniversary in 2002. In that year alone, more than 177 lives were rescued in the United States or its waters with the assistance of NOAA satellites and key international partners. This global search and rescue system uses United States and Russian satellites to detect and locate emergency beacons indicating distress. Currently, the beacon transmitters are carried aboard ships and aircraft, but in 2003 will also be available to hikers. Originally sponsored during the cold war by Canada, France, the Russian Federation and the United States, Cospas-Sarsat now includes 36 nations. The system operates 24 hours a day, 365 days a year.



Cospas-Sarsat rescues by year and cumulative.

In just one week during the summer, five rescues were recorded in three separate incidents. One occurred 100 nautical miles southeast of New Orleans, Louisiana when a crew member on a fishing vessel suffered a stroke. Two rescues were recorded in the second incident, near Monterey, California, when a sailing vessel lost its position in dense fog. In the third incident, two rescues were recorded 4.5 nautical miles south of Bass River, Massachusetts, after a sailing vessel sank, leaving the crew clinging to a life raft.

A transition from analog to modernized 406 MHz digital beacons continues. At the end of 2002 approximately 12,180 more digital beacons were registered than the previous year, for a total of 89,900. The digital beacons transmit on a special frequency that is far less prone to interference and consequential false alerts. Also, the digital signals can be stored aboard a satellite for quick relay to the next available ground station.

In 2003, thousands of hikers and outdoor adventurers will benefit from a planned Cospas-Sarsat expansion to cover personal locator beacons over the continental U.S. This increase in service is the result of a successful experiment with such coverage in Alaska.

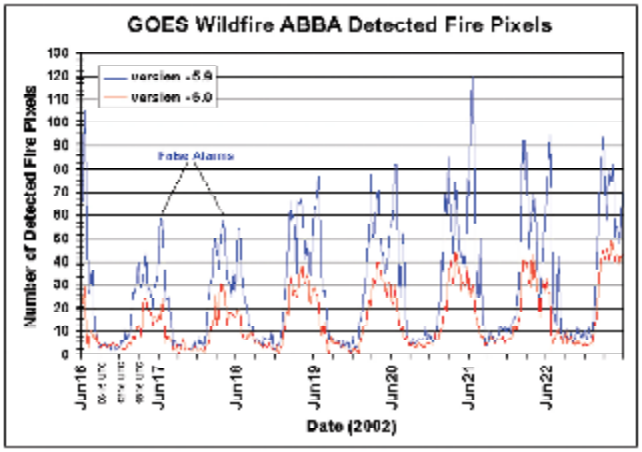
http://www.sarsat.noaa.gov/

Wildfire Detection from NOAA Satellites

Due to severe drought conditions throughout much of the United States and Canada, 2002 turned out to be a year of extensive wildfires. According to the National Interagency Fire Center in Boise, Idaho, more than 70,000 fires burned more than 7 million acres of the United States, which is nearly double the 10 year average. NESDIS helped to mitigate this hazard through its enhanced fire detection program. In September 2002, the Wildfire Automated

Biomass Burning Algorithm (ABBA) became an operational tool for fire weather forecasters. Fire managers and state officials within the United States now have accurate high-resolution information on fire locations from NOAA satellite imagery 24 hours a day/ 7 days a week.

The Wildfire-ABBA, first demonstrated experimentally in 2001, detects fires from NOAA's Geostationary Operational Environmental Satellites (GOES). In 2002, NESDIS scientists improved this fire detection algorithm to reduce false detections (see graph). ABBA was also integrated into the new Hazard Mapping System (HMS) Fire and Smoke product. While automated fire detections from NOAA and NASA satellites are released immediately to satisfy the needs of real-time emergency responders, an integrated, quality controlled HMS product is updated by NESDIS scientists several times throughout the day.



The "true blue" represents real fires detected in peak burning season 2002, using the improved technique. The red indicates false alarms generated from the previous ABBA version.

http://nhis7.wwb.noaa.gov/website/SSDFire/viewer.htm

All fire location data are made available through a web-based Geographic Information System (GIS), making them useful to emergency managers and other officials, who can quickly view the data in context with other relevant information on customized maps.

In June 2002, Colorado experienced the largest fire in the state's history, the Hayman fire. NESDIS responded by activating the NOAA 16 polar orbiting satellite channel (3.7 micron) best suited for fire detection. NESDIS also provided extra detailed imagery through the Operational Significant Event Imagery program.

The Hazard Mapping System (HMS) Fire and Smoke Product is created by NESDIS satellite analysts who integrate automated fire detections from multiple satellites and provide quality control by analyzing satellite imagery.

VI. IMPROVING PUBLIC UNDERSTANDING THROUGH OUTREACH

NOAA Library Increases Service to the Public

The NOAA Central Library, an information resource within NESDIS, increased the number of online journals available by 20 percent, making access to these resources easier for NOAA scientists and the public in 2002.

While making the most of Internet technology, the library also improved access to books and other paper records from the past. On October 29, the staff dedicated a sanctuary for rare documents relating to the history of the oceanic and atmospheric sciences, the Charles Fitzhugh Talman Special Collections Room. Talman was the public

Talman Family at the dedication at NOAA Headquarters.

voice of the United States Weather Bureau. In 1908 he was placed in charge of the Weather Bureau Library, a predecessor to the NOAA Central Library.

He held that position until his death in 1936. He produced more than 3,000 radio addresses, authored 15 books and published many articles. But his key contribution to meteorology was his compilation of more than 15,000 weather terms from around the world, which served as the basis for the first Weather Glossary. It was published by the Weather Bureau in 1946.

NESDIS continued to make information easily accessible to the public via the Internet, showing an 18 percent growth in users over 2001. In 2001, NESDIS Web sites had 5,318,703 users. In 2002, the sites had 6.279,984 users.

GOES Satellite Users Collaborate

The second GOES User Conference was held in Boulder, Colorado, October 1 — 3, 2002, with cooperation from other government agencies and non-governmental organizations. They included NASA, the National Institute for Standards and Technology (NIST), the American Meteorological Society, the National Weather Association, and the World Meteorological Organization. Approximately 200 participants from federal agencies, academia, private industry and the international community exchanged ideas on user needs, potential capabilities, and benefits of advanced instruments and products proposed for the GOES-R series.
Recommendations were provided on all aspects of the next generation of GOES, including instrument characteristics, product needs, user and societal benefits, product distribution, data and product archiving, and user education. The focus was more on ocean and climate requirements and applications than in the previous GOES User conference, which was held in May of 2001.

http://www.osd.noaa.gov/goes_R/goesrconf.htm

Outreach to Satellite Direct Readout Users

NESDIS held a Satellite Direct Readout Conference for the Americas in Miami, on Dec. 9 — 13, 2002. Satellite data users in North, Central and South America including educators operating their own satellite data receiving stations comprised nearly 230 attendees representing nearly 40 countries. Twenty-one commercial exhibitors attended as well.
To access future NOAA satellite data, users from many of those countries will have to upgrade and replace much of their satellite receiving equipment. NOAA and conference attendees collaborated on ways to minimize the impact and find possible alternative means of real-time satellite distribution in the next decade.

NOAA Satellite Partners & Constituents Meet at MAXI 2002

The NPOESS Integrated Program Office hosted an information exchange conference October 29 —31, 2002. The

MAXI Review served as a venue for reviewing the status of U.S. environmental satellite programs. Approximately 420 attendees represented the military, civil and commercial satellite sectors, as well as universities and EUMETSAT, the European Organisation for the Exploitation of Meteorological Satellites. MAXI Review 2003 will be hosted by the United States Air Force — a member of the tri-agency NPOESS Program.

http://www.ipo.noaa.gov/News/Maxi2002/MAXI2002.html

Visit to NOAA Science On A Sphere by Congressional School 5th grade, Falls Church, VA.

Science on a Sphere Shows Off NOAA Data

Science on a Sphere, a prototype hands-on environmental education tool, debuted in 2002 at a middle school in Colorado and at NOAA headquarters. Experiencing the 3-D presentation is much like seeing the Earth from space. Images from NOAA's environmental satellites, climate forecasts from computer models of the atmosphere, and data on land-surface and ocean-bottom topography are projected onto a five foot sphere. Students can watch a hurricane develop, and see ridges, canyons and crustal plates beneath the oceans. They can also see NOAA's Geophysical Data Center imagery of nighttime lights on the Earth to determine the correct location of various cities, countries and other cultural and physical features.

http://www.fsl.noaa.gov/sos/index.html

NOAA's Climate Data Center Hosts Teachers

In cooperation with the University of North Carolina-Asheville, NOAA's Climate Data Center continued its yearly workshop for educators entitled Satellites in Our Everyday World on March 14 to 16, 2002. More than 50 middle and high school science teachers, scientists and others with an interest in satellite remote sensing participated. The conference offers middle and high school science teachers a basic understanding of the techniques and applications of satellite remote sensing. Teachers participating in the conference also qualified for professional continuing education credit.

Http://noaasis.noaa.gov/2002/index.html

In accordance with the Land Remote Sensing Policy Act of 1992, the Department of Commerce is responsible for licensing the operation of commercial remote sensing satellite systems. NESDIS plays a significant role in this process, through its International and Interagency Affairs Office. In 2002, NOAA granted one license, approved eight license amendments, and approved six licensee foreign agreements. The foreign agreements are valued at $76 million.

NOAA's Advisory Committee on Commercial Remote Sensing (ACCRES) was established in 2002, holding its first meeting on September 30th. NOAA asked ACCRES to consider ways that it could work with other U.S. agencies, along with foreign governments, to create a better business environment for U.S. commercial remote sensing firms.

The Advisory Committee has also been charged with exploring licensing provisions to enable federal agencies to buy commercial data, and effectively integrate it into civilian and military activities. ACCRES will also examine ways that NOAA should license new and increasingly advanced, commercial dual-use technologies, which have significant military and intelligence applications. Those technologies include synthetic aperture radar, hyperspectral imaging, and laser-based Light Detection and Ranging (LIDAR).

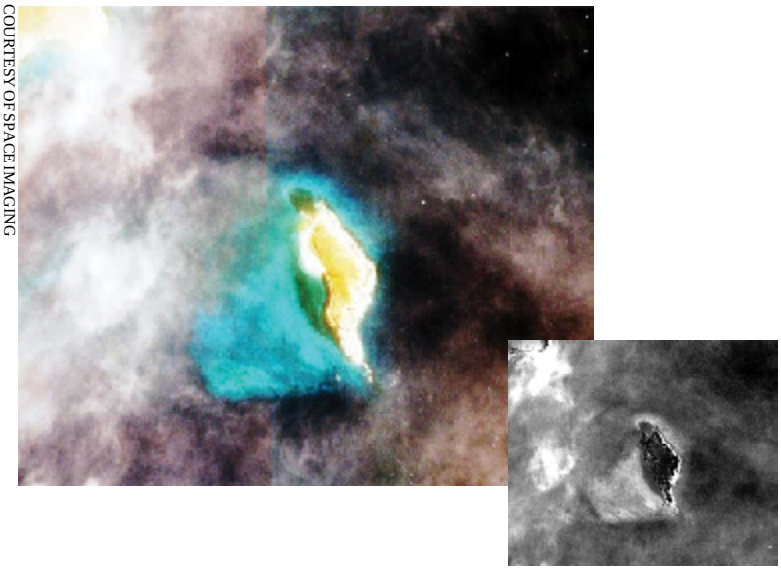
http://www.licensing.noaa.gov/

This .6-meter natural color image of the Port of Hamburg was collected by QuickBird on May 10, 2002. The multi-colored container array featured in this image demonstrates the rich spectral characteristics of DigitalGlobe's natural color imagery, as well as the sharp spatial resolution. This image chip is focused on the Burchardkai Container Terminal at the Port of Hamburg.

COURTESY OF DIGITALGLOBE

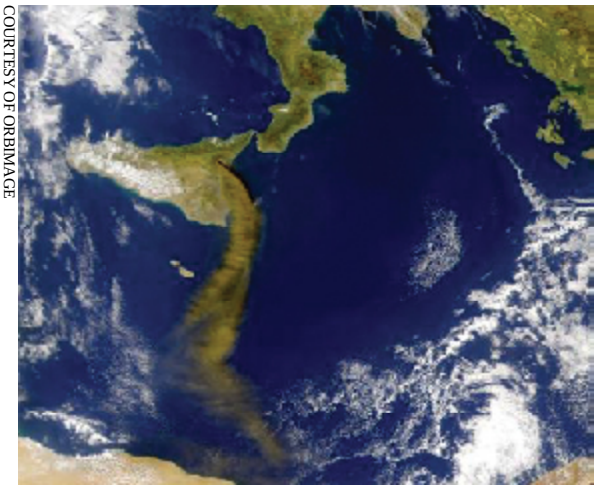
In 2002 NESDIS pioneered the satellite detection of coral reef bleaching induced by high sea water temperatures. Satellite detection of bleaching requires high spatial resolution, a spectral band capable of seeing bottom features, and low cloud cover imagery acquired while bleaching is present. NESDIS demonstrated this capability using commercial multispectral IKONOS imagery acquired by Space Imaging Inc. of the Keppel Islands in the Australian Great Barrier Reef during a heavy bleaching event in early 2002. The color image, acquired April 15, 2002, shows the bleached reef area as a pale blue or cyan. The black and white image confirms the detection of bleaching by differencing IKONOS images from before the bleaching event (August 2001) and during the bleaching.

COURTESY OF SPACE IMAGING



A large mass of black water swept through Florida Bay and according to reports, then broke up into smaller pockets aggregated along the north side of the 126-mile long Florida Keys. First seen in late December/early January, scientists sampled the water in hopes of identifying the source of this event. The SeaWiFS image taken by ORBIMAGE's OrbView-2 on February 4, 2002 at the height of the event, clearly shows different colors of water in Florida Bay. In addition to the scientific interest in this phenomenon, there appear to be some serious ecological consequences, including the apparent impact on the coral reefs. Recent evidence points to the black water being associated with a large algal bloom fed by increased nutrient input from a land-based source.

COURTESY OF ORBIMAGE



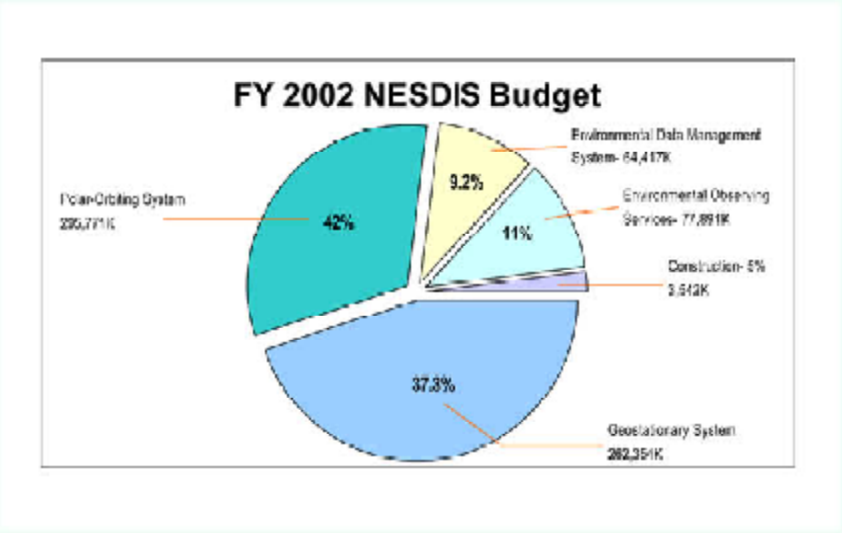
Budget

NESDIS procures, launches and operates two types of satellites to provide worldwide environmental data and information products and services to Federal agencies, state and local governments, and private users. NESDIS has two main budget sub-activities: the satellite observing systems and the environmental data management systems.

NESDIS satellites are the mainstay of the Nation's weather information and provide support to NOAA's environmental prediction and stewardship mission. The satellite observing systems and environmental observing services account for 89% of the budget and include the polar-orbiting and geostationary satellites. Monitoring activities include ocean remote sensing; new and improved applications and products; improved atmospheric, oceanic, and U.S. coastal operations; as well as data distribution.

Environmental data management, the other main budget sub-activity, offers worldwide environmental data and information products and services in the atmospheric, marine, solid Earth, and solar-terrestrial sciences. The environmental data management systems account for 10% of the NESDIS budget.

The design of a new facility and the renovation of existing NESDIS facilities in Suitland, Maryland, account for the remaining 2% of the budget.



Polar-orbiting System
$295,771 (42%)

Geostationary System
$262,354 (37.3%)

Environmental Observing Services
$77,891 (11%)

Environmental Data Management System
$64,417 (9.2%)

Construction
$3,542 (.5%)

TOTAL NESDIS
$703,975 (100%)

In NESDIS, more than 74 cents of every dollar goes to industry. In FY 2002, our annual budget exceeded $704 million. Estimated contract value for our satellite and environmental data programs and services was in excess of $470 million. This amount was distributed through numerous contracts going to over 35 states providing jobs and opportunities for local and regional economies.

Climatic Data

National Climatic Data Center
151 Patton Avenue
Asheville, NC 28801-5001
828-271-4800
TDD 828-271-4010
http://www.ncdc.noaa.gov

Constituency Information

NESDIS Constituent Affairs Office
SSMC-1
1335 East-West Highway, Room 7103
Silver Spring, MD 20910-3282
301-713-1022
http://www.nesdis.noaa.gov/constituents/index.html

Education and Diversity Information

Educational and Diversity Coordinator
SSMC-1
1335 East-West Highway, Room 8244
Silver Spring, MD 20910-3282
301-713-9200 ext 118
http://www.nesdis.noaa.gov/Diversity/divhomepage.html

Geophysical Data

National Geophysical Data Center
325 Broadway
Boulder, CO 80305
303-497-6826
TDD 303-497-6958
http://www.ngdc.noaa.gov

NESDIS Headquarters in Silver Spring, MD.

International and Interagency Activities

International and Interagency Affairs Office
SSMC-1
1335 East-West Highway, Room 7311
Silver Spring, MD 20910-3282
301-713-2024
http://www.nesdisia.noaa.gov

Library Services

NOAA Central Library and Information Services Division
SSMC-3
1315 East-West Highway, 2nd Floor
Silver Spring, MD 20910-6233
301-713-2607 ext 124
http://www.lib.noaa.gov

Media Information and Interviews

NESDIS Public Affairs Officer
Federal Building 4, Room 3313A
5200 Auth Road
Suitland, MD 20746-4304
301-457-5005
http://www.noaa.gov, click on "Public Affairs"

Oceanographic Data

National Oceanographic Data Center
SSMC-3
1315 East-West Highway, Room 4820
Silver Spring, MD 20910-3282
301-713-3277
http://www.nodc.noaa.gov

National Coastal Data Development Center

Building 1100, Room 101
Stennis Space Center, MS 39529
Regular phone: 228-688-2936
Toll-free 866-732-2382
http://www.ncddc.noaa.gov

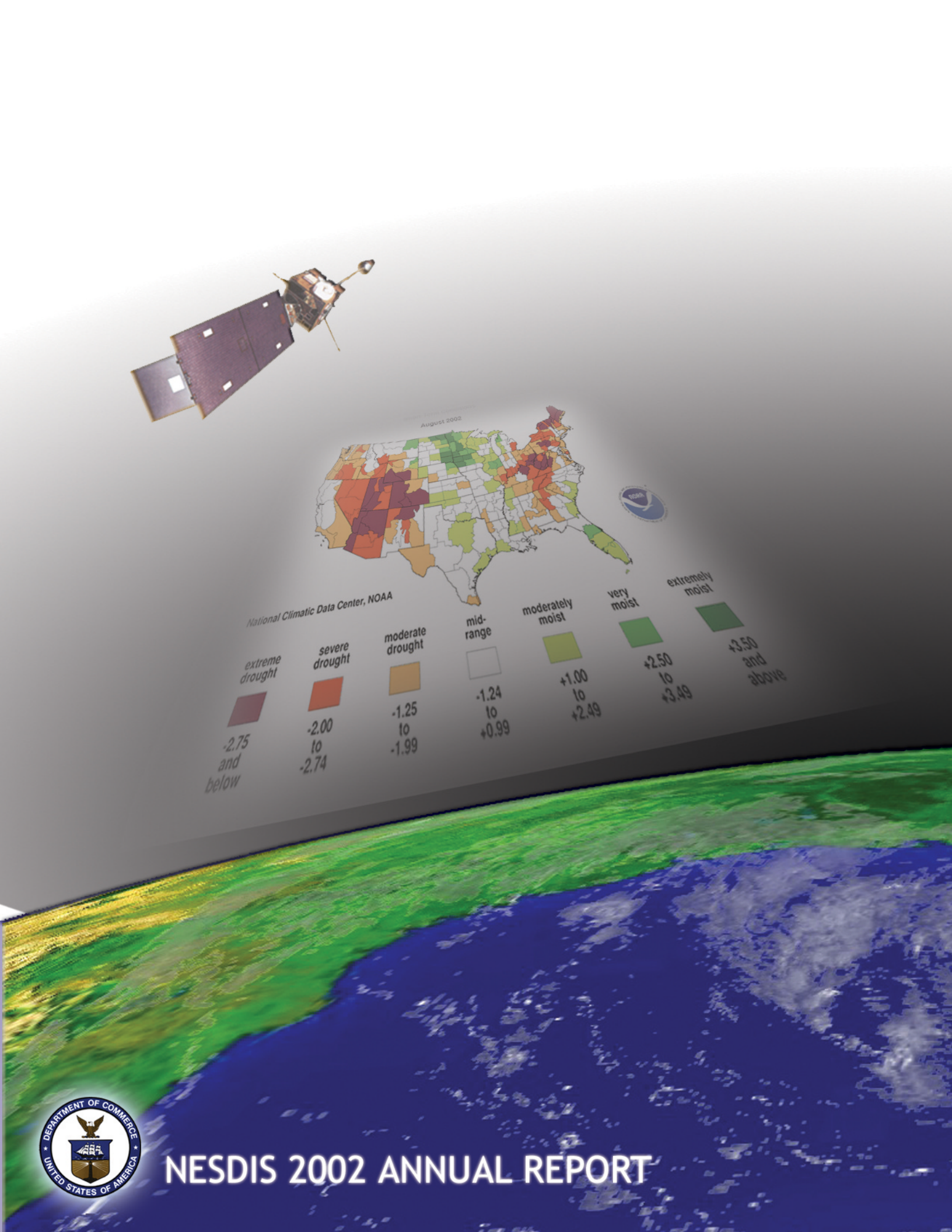
Editors: Jane D'Aguanno, Allan Eustis, Mary Glackin, Charles Wooldridge.
Technical Writer: Nancy Nickell
Layout: Marc Pulliam

EVERETT ABBOTT DIANA L. ABNEY STANLEY J. ABNEY MARY ADAMS ANDREW ADKINS, JR CAROLYN ALDERMAN ANDREW ALLEGRA DONALD L. ALLEN JAMES S. ALLEN PAUL C. ALLEN DAWN ANDERS DAVID M. ANDERSON DONNA M. ANDERSON DOROTHY L. ANDERSON GLORIA E. ANDERSON WILLIAM ANGEL JIMI ANZELC JEFFREY ARNFIELD JOSEPH ASKEW STEVEN ATKINS ROBERT AUNE LYNNE AXTELL GARRY AYRES TERRY BABB SHYAM BAJPAI CLIFFORD B. BAKER EDWARD M. BAKER RICHARD T. BALDWIN THOMAS BALDWIN ANNE BALL JAMES BALLOU BARBARA BANKS WALID BANNOURA RICHARD BARAZOTTO ALVA BARNETTE CELSO BARRIENTOS RICHARD BARTH ALAN BASIST ROBERT BASSETT JOHN BATES BRUCE BAUER ERIC BAYLER JOHN BEALL RUSSELL BEARD JANICE BEATTIE THOMAS BECKER MICHAEL BECKMAN PHYLLIS BELLAMY TONI D. BELLAMY MARIA BELLO EDWARD T. BELOTE, JR PATRICK S. BELOTE CURTIS W. BENNER DAVID A. BENNER DELMA BENNETT JAMES BERGER EUGENE J. BERRY PAULA E. BERRY CHERYL BERTOIA HARRIETT BLEVINS BRIAN BLOEDEL HAL BLOOM MATTHEW BODOSKY MARK BOLAND RICHARD BORNEMAN JULIE BOSCH LISA BOTLUK KAREN BOWIE DAVID BOWMAN BARBARA O. BOYD THOMAS L. BOYD TIMOTHY BOYER LINDA BRADEN CAROLYN BRADFORD CARMELA BRADSHAW JAMES BRADY GEORGE BRANDON DOUGLAS BRAUER DEBRA BRAUN CAROL BREGER MARK BRIELE DANNY BRINEGAR RANDAL BRINKER ROBERT BRITTER BARBARA D. BROOKS FRANCES BROOKS RICHARD C. BROOKS TODD H. BROOKS DANIEL R. BROWN, JR ALONZO M. BROWN CHRISTOPHER W. BROWN CYNTHIA BROWN DAVID E. BROWN DOROTHY BROWN LINDA A. BROWN WILLIAM O. BROWN EMILIE BRUCHON ALBERTA BRUNSON JOSEPH BRUST, JR CHARLES S. BRYANT JULIE J. BRYANT DONNA BUCKLEY JAMES BUDD RONALD BUHMANN MICHAEL BURGIN WILLIAM BURKHART THEODORE BURLEW, JR MARY BURRIS THOMAS BUTTON HYRE BYSAL CHERYL A. CALDWELL PATRICK C. CALDWELL GEARY CALLAN LOUIS CAMBARDELLA ROBERT CAMERON JOHN CAMPAGNOLI JOYCE CAMPBELL JOHN CANTER CHANGYONG CAO SHARON CAPPS HILL ROBERT CAREY HOWARD CARNEY, JR CHARLES F. CARPENTER, JR JAN A. CARPENTER LARRY W. CARR LILA P. CARR TYRONDA M. CARR DONALD CARROLL ANDREW CARSON ALFREDA M. CARTER EMILY M. CARTER LILLIAN R. CARTER SHIRLEY S. CARTER STEVEN L. CARTER WILLIAM A. CARTER CHRISTOPHER CARTWRIGHT JOSEPH CATALAN MICHAEL CHALFANT KIMBERLY CHAMBERLAIN PAUL CHANG LAURA CHAPMAN DIMITRI CHAPPAS DOUGLAS CHARNOCK, JR SAM CHEN ROBERT CHENEY HOMER CHERRIX TROY CHERRY MAUREEN CHIARIZIA ERIC CHIPMAN JOHNNY R. CLARK, JR CRAIG A. CLARK DAVID M. CLARK DEBRA E. CLARK DENNIS K. CLARK JEFFREY D. CLARK PABLO CLEMENTE COLON HELEN COFFEY ROSALIND COHEN MORRIS COLE BERRY COLEMAN RICHARD COLEY SHARON COLLEY DONALD COLLINS ELAINE V. COLLINS KAY E. COLLINS MARIE COLTON GUSTAVE COMEYNE III RALPH CONLIN LAURENCE CONNOR JEAN CONRAD BARBARA COOK BRENDA COOKE DENNIS COPE ARLENE CRAIG MICHAEL CRANE VAN CRAWFORD TAMARA CREECH ANGELA CRENSHAW MICHAEL CRISON ROY I. CROCKETT, JR DENNIS E. CROCKETT EVELINE CROPPER RUBY CUBANO MARY CUMBERPATCH BRENDA CUMBIE JOHN CUNNINGHAM JANE D'AGUANNO CAROLYN ANTONIO PATRICIA DAENECKE HARRY DAHLBERG, JR JAIME DANIELS HERMAN DANTZLER DAVID DATER VAUGHN W. DAVIS, JR GARY K. DAVIS JOHN W. DAVIS TIJUANNA DECOSTER MARTIN DEISEROTH STEPHEN DELGRECO CLAUDE DELLINGER MARK DEMARIA ROBERT DENNIS THOMAS DERRICKSON SUSAN DEVINE HOWARD DIAMOND DIANNE DICUS KATHY DINKINS KYLE DION FATIMA DIOP GERALD DITTBERNER DAVID DIVINS JEROME W. DORSEY WARREN F. DORSEY STEPHEN DOTY HENRY DRAHOS, JR ANDRE DRESS ANGELA DUCKETT BROWNIE DUDLEY MARY DUGGAN PAULA DUNBAR ANN DUNKER MICHAEL DURAN IMKE DURRE PARMESH DWIVEDI CARLON EAKIN TINA EAST DAVID EASTERLING DENNIS EBERTS MARGARET ECKARD DAVID EDDY MAI E EDWARDS LEON ELLISON GARY ELLROD JOE ELMS STANLEY ELSWICK CHRISTOPHER ELVIDGE MARCUS ERTLE EDWARD ERWIN TERRI ESHAM ROBERT ESKRIDGE ALLAN EUSTIS CRAIG EVANEGO WILLIAM EVANS ELIZABETH EWELL DEVOYD EZELL WAYNE FAAS JOHN FAUERBACH ROBERT FENNIMORE, JR CHARLES FENNO ANGELA FERGUSON RALPH FERRARO, JR KATHERINE FINCHER ROBERT FINSON ANNA FIOLEK EDWIN FISHER JEAN FITCH MICHAEL FITZMAURICE, JR DANIEL FLANAGAN ROBERT FLEEMAN ROSE FLEMING STEPHEN E. FLEMING LAWRENCE FLYNN MICHAEL FORD DAVID FORSYTH WALTER FRANCE DEBORAH FRANKLIN PHALA FRANKS HELEN FREDERICK RICHARD FREEMAN PAUL FULENWIDER DAVID FURLONG MICHAEL GALEONE GREGORY GALLINA KEVIN GALLO NANCY GARDNER RICHARD GAREY ROBERT GELFELD HELEN GIBSON MARY GLACKIN BYRON E. GLEASON KARIN L. GLEASON BRENT GODDARD CATHERINE GODFREY HILDA GOHRBAND MITCHELL GOLDBERG DAVID GOLDSMITH GEOFFREY GOODRUM LYNN GOSS SYLVIA GRAFF VINCENT GRANO AXEL GRAUMANN DONALD GRAY CAROL A. GREEN JOSEPH P. GREEN MARGARITA GREGG LARRY GRIFFIN MARY GRIFFIN TRINA M. GRIFFIN DORIA GRIMES PETER GRIMM BYRON GRISHAM III NORMAN GRODY WENDY GROSS ARNOLD GRUBER INGRID GUCH JAMES GURKA JOSE GUTIERREZ NATHANIEL GUTTMAN RAY HABERMANN CONSWELLA HACKNEY IDA HAKKARINEN MICHAEL HALES GEORGE T. HALL, JR ALAN D. HALL DEVERY L. HALL MARK O. HALL NORMAN F. HALL WARREN A. HALL EDWARD HAMBLIN MELANIE HAMILTON GREGORY HAMMER CYNTHIA HAMPTON DONG HAN JAY HANNA JERRY HARDY BILLY HARLESS, SR JAMES HARLEY JAMES HARMON, JR CHARLES R. HARRIS HEIDI HARRIS EMILY HARROD JAMES HAUGHEY SHARON HAWKINS DEBRIA HAYES MICHAEL HAZEL, MARK HEALY ANDREW HEIDINGER LISA HEILMEIER RICHARD HEIM, JR MICHAEL HELFERT SEAN HELFRICH CLAUDE J. HENSLEY GRACE M. HENSLEY EDWARD HERBRECHTSMEIER ROGER HEYMANN BRIAN K. HILL MICHAEL L. HILL DONALD HILLGER CONRAD HINSON ALLEN HITTELMAN SAMUEL HOCKING MICHAEL HODGES JOHN HOFFMAN CURTIS HOLLAND MARY HOLLINGER FRANCES HOLT CHARLES HOOK RONALD HOOKER KAREN HORAN SEYED HOSSEINI COLBY HOSTETLER PHILIP HOVEY EDWARD G. HOWARD JASON L. HOWARD PAUL HUDSPETH JOAN HUFTON BRIAN HUGHES GEORGE W. HUGHES JOHN P. HUGHES KENT H. HUGHES PAMELA Y. HUGHES BRENDA HUMPHRIES-ROBINSON TOBY HUTCHINGS GLENN HYATT JOY IKELMAN CHERYL INGRAM ANTONIO IRVING DAVID IRWIN DENISE JACKSON NINA L. JACKSON SCOTT E. JACKSON RUSSELL JACOBS LINDA JAMERSON LAWRENCE S. JAMES RICHARD F. JAMES JEFFREY W. JENNER JOHN A. JENSEN MICHAEL D. JENSEN JUANITA JILES BEVERLY A. JOHNSON DAPHNE R. JOHNSON DENNIS L. JOHNSON GREGORY P. JOHNSON MARY M. JOHNSON PHILLIP S. JOHNSON MARIA N. JONES QUEEN E. JONES SHARON JONES




CHARLES KADIN MICHAEL KANE CYNTHIA B. KARL THOMAS R. KARL CARL KARLBURG OTTO KARST WILLIAM KAYES MARILENE KAZIOR KATHLEEN KELLY WILLIAM KEULL JEFFREY KEY JAMIE KIBLER ALEXANDER KIDD KATHERINE KIDWELL ERIC KIHN JOHN KINEMAN BEVERLY KING JOHN KINSFATHER PATRICIA KIRK STEVEN KIRKNER THOMAS KLEESPIES JOSEPH KLEIN MARY KLISCHER DARREL KNOLL ISADORA KNOX JOHN KOBAR NINA KOENICK BRENDA KOENIG CHAD E. KOENIG FELIX KOGAN SHOBHA KONDRAGUNTA JOSEPH KRAFT JEFFREY KROB HERBERT KROEHL JOHN KUHN ROBERT KULIGOWSKI SHELDON KUSSELSON LASHAWN KYLE DENNIS LACKEY SUSAN LADENHEIM JOHANNA LANG LEON LARRY BLAKE LASHER ISTVAN LASZLO LEVIN LAURITSON PHILLIP LAUTENSCHLAGER ANTHONY LAVOI REGINALD LAWRENCE JAY LAWRIMORE ROSALIND LEDFORD SHARON LEDUC KATHLEEN LEFEVRE DONNA LEFLER VERNA LEFTWOOD RICHARD LEGECKIS EUGENE LEGG MICHELLE LEVESQUE ROBERT LEVIN KEITH LEVINSON SYDNEY LEVITUS MARY LEWIS XIAOFAN LI KIRK LIANG JOHN LILLIBRIDGE III GEORGE LINVILL JACK LOTT IV MICHAEL LOUGHRIDGE ELIZABETH LOVE-BROTAK JOHN LOVING PHILLIP LUCICH KEVIN LUDLUM CHARLES MACFARLAND ERIC MADSEN JOANNE MAGOULAS DENNIS MAILHOT ROBERT MAIRS KEITH MANN DANIEL MANNS DEBRA MARCHANT KAREN MARKS JAMES M. MARTIN JR KATHLEEN A. MARTIN CATHERINE MARZIN BROOKS D. MASON ELAINE H. MASON JAMES E. MASON ROBERT MASTERS KARON MATHEWS MICHAEL MATSON EILEEN MATURI BILLIE MAYBIN WILFRED MAZUR DAVID MCADOO GARY MCBRIEN KIMBERLY MCCARTY MILTON MCCOWN GARY MCCREARY DOUGLAS MCELREATH ALVIN MCGAHEE DAVID MCGINNIS KEITH MCKENZIE ALITA MCKINLEY TAMMY MCLAUGHLIN SUSAN MCLEAN ALBERT MCMATH, JR LARRY MCMILLIN ALAN MCNAB DONNA MCNAMARA ROBERTA MCQUILKIN EILEEN MCVEY JEFFREY MEEKINS AJAY MEHTA RALPH MEIGGS MATTHEW MENNE WOLFGANG MENZEL NANCY MERCKLE EUGENE MERRITT LAURA K. METCALF THERESSA D. METCALF BARBARA METZ DAN METZGER MICHAEL MIGNOGNO DOLORES B. MILLER EDWARD M. MILLER ERIC J. MILLER KAREN L. MILLER LAURENCE L. MILLER MARTHA S. MILLER BARRY MILLS FRANCIS J. MITCHELL GARY C. MITCHELL TSAN MO GORDON MOILES DEBRA MOLENAR LISA MONAHAN ROBERT MONEY LINDA MOODIE CARLA J. MOORE DANIEL L. MOORE JEANNETTE A. MOORE JOHN C. MOORE RHONDA MOORING JOHN MORAN TAHARA MORENO JAMES MORRIS JUDITH MORRISON KENNETH MUGFORD JOSEPH E. MULLIGAN PATRICIA J. MULLIGAN RONALD MUMMA GREGORY MUNDY DANIELLA MUNGO MARILYN A. MURPHY WILLIAM B. MURPHY DERRICK MURRAY REGINA A. MURRAY KENNETH MYLES ROBERT NAGAN DOUGLAS NAMIAN SELINA NAUMAN CHERYL NAVE PHILLIP NEAL BRUCE NEEDHAM RYAN NELSON TERESA NERO ARTHUR NEUENDORFFER CARL NEWLON VIHA NGUYEN CATHERINE NICHOLS MURRAY NICODEMUS WILLIAM NOCK DONALD NORTRUP KIMBERLY NYE TODD O'BRIAN MARY O'CHERRY CHRISTOPHER O'CONNORS ERIC OGATA DAVID OGDEN RICHARD OHLEMACHER JON OLSON KAREN S. OWEN TIMOTHY W. OWEN JANICE OWENS COBBLAH RHONDA PALUBA JOHN PAQUETTE GREGG PARENT CECIL PARIS FREUD PARK JAMES PARKER WALTER PARKS JACKIE PASSMORE SAMUEL PATTERSON II MARLENE A. PATTERSON CYNTHIA PAWLISH CATHERINE PAXTON DEBORA E. PAYNE ERNEST R. PAYNE VICKI PECK JESSICA PEJSA RONALD PENN JOHN PEREIRA JOSEPH PEREZ MARLIN PERKINS THOMAS PETERSON GILBERT PHELPS CHARLES S. PHILLIPS JOHN R. PHILLIPS SHERI A. PHILLIPS ANTHONY PICCIOLO WILLIAM PICHEL LINDA PIKULA KAROL PITTMAN MARC PLANTICO PENNY POOLE MICHAEL PORCH LARRY POTTS VIRGINIA PRESSLEY LINDA PRESTON ELAINE PRINS KENNETH PRYOR PETER PYTLOWANY STEVEN QUILLEN DENNIS QUINN STEVEN RABER RONALD RADEMACHER BRUCE RAMSAY ROBERT RANK NANCY RATHBURN HENRY RAY III JAMES RAY RONALD D. RAY ANTHONY REALE JOAN REED GEORGE REEDY LETECIA REEVES ANN REISER THOMAS RENKEVENS ALAN REVELL RICHARD G. REYNOLDS RICHARD W. REYNOLDS THOMAS E. REYNOLDS SHARON RICH RASHELLE RICHARDSON DEBORAH RIDDLE BARRY RIGGIN ANTHONY RIOS CARMELO RIVERA JEANNETTE RIVERA JEFFREY ROBEL THOMAS ROBERTS ROBERT ROBIE DIANE ROBINSON ROBERT ROBLIN DONALD ROBY JENNIFER ROCHESTER MICHAEL RODRIGUEZ CAROL ROGERS MIGUEL ROSARIO FELIX DOUGLAS P. ROSS THOMAS F. ROSS LOUIS RUBIN MARK RUMINSKI GLENN RUTLEDGE STEVEN RUTZ JOSEPH SALAZAR SHAHID SALMAN LINDA SALYERS PATRICIA SANCHEZ JOHN SAPPER GEORGE SAXTON HARLOTTE L. SAZAMA WILLIAM J. SAZAMA JOANN SCEIZINA JAMES M. SCHAEFFER STEVEN A. SCHAFFER ELIZAB SCHENCK-GARDNER WALTER SCHLEICHER, JR KENNETH SCHMIDT TIMOTHY SCHMIT KURT SCHNEBELE DAVID SCHOOLCRAFT THOMAS SCHOTT RICHARD SCHREITZ ALAN SCHWARTZ RODERICK SCOFIELD MARK SEIDERMAN GLEN SELBY EDWARD C. SEMAN LANCE E. SEMAN GEORGE SERAFINO JANICE SESSING MICHAEL SETTLES JOHN SHADID, JR JOYCE SHAFFER GEORGE SHARMAN III BONITA SHARPE JAMES SHERIDAN LESTER SHIPLEY, JR AUGUST SHUMBERA, JR RAYMOND SILFA HERNAN SILVA JOHN SIMKO MICHAEL SIMMONS CORNELIA SIMONS NAAMAN SIMPSON GEORGE SINCLAIR, JR MARGARET SKEOCH DONNIE SLACK MARK SLEEPER PETER SLOSS RHAPSODY SMITH DEARRING THOMAS E. SMITH, JR ALISA B .SMITH DAVID B. SMITH DAVID N. SMITH DAVID P. SMITH ELIZABETH O. SMITH JONATHAN M. SMITH LAKEL A. SMITH THOMAS M. SMITH WALTER H. SMITH JANIS G. SMYLY MARSHALL S. SMYLY THOMAS SNELL DOUGLAS SNOWDEN NICOLE SOLOMON JESSE W. SPEIDEL WILLIAM J. SPEIDEL ALBERT B. SPENCER, JR TERESSA SPENCER KENNETH ST LOUIS SUSAN STARKE LINDA STATLER GERAVIA STEELE RAYMOND STEINER ERIC STENGEL CATHERINE O. STEPHENS GEORGE STEPHENS SCOTT E. STEPHENS PETER STEURER WILLIAM STEWART SIDNEY STILLWAUGH JOSEPH STINUS JESSE STRAND DAVIDA STREETT ALAN STRONG TIMOTHY STRYKER JERRY SULLIVAN ROBERT SUMMERS LEANGCHWAN SUN GRACE SWANSON DENISE SYLVESTER EDWARD TABOR CHANG KOU TAI GEORGE TALARSKI JERALD TARPLEY, JR KENDRA TARVER RENEE TATUSKO LISA A. TAYLOR PAMELA M. TAYLOR GENE R. TERRY ROE E. TERRY MARGARET TESSIER ALBERT THEBERGE, JR JOHN L. THOMAS CHARLES THOMASON, JR SHELLY THOMPSON JOSEPH THORNTON CLARENCE TIGNOR ARLA TILLMAN MICHAEL TOMLINSON ROGER TORSTENSON WILLIAM TSENG YO KUNG TSUI MICHAEL TURK KELLY M. TURNER KEVIN L. TURNER KYLE D. TURNER STEVEN R. TURNER ROBERT TYE MICHAEL URZEN JAMES VALENTI MICHAEL VAN WOERT CHARLES VANCE ROBERT VANWIE CAROL VAUGHN SARA VEASEY DAVID VERCELLI KISHA VERDELL JOHN R. VINCENT KATY M. VINCENT FREDERICK VIZBULIS RUSSELL VOSE BRIAN VOSS ANGELO G. WADE GARY S. WADE LEESALEE WALKER JANET WALL CARLA M. WALLACE CAROL WALLACE STEVEN D. WALLACE ALVA WALLIS, JR TIMOTHY WALSH REGIS WALTER, JR VAN WANG ANDREW WARDRETT BARBARA WARNICK ROBIN WARNKEN DONNA C. WARREN MICHAEL W. WARREN EUNICE WARRINGTON BENJAMIN W. WATKINS CARMELLA D. WATKINS JOHN WEAVER MICHAEL WEINREB ROGER WELDON FUZHONG WENG PHILIP WHALEY JOSEPH WHITE IV FREDERICK L. WHITE, JR JAMES L. WHITE SANDRA C. WHITE HILERY WHITEHURST HARRY WHITELEY PETER WILCZYNSKI DANIEL WILKINSON CLAUDE N. WILLIAMS JR DONNA L. WILLIAMS HOWARD F. WILLIAMS KEVIN L. WILLIAMS LINDA J. WILLIAMS LINDSEY B. WILLIAMS TYRONE L. WILLIAMS WAYNE WILMOT MONROE O. WILSON WILLIAM S. WILSON ROGER WINCHELL WAYNE WINSTON GREGORY WITHEE PAUL WOFSY VERNELL WOLDU WINIFRED WOMACK HELEN WOOD CONNIE WOODHOUSE MAUREEN WOODS CHARLES WOOLDRIDGE VICKIE WRIGHT THOMAS WRUBLEWSKI CHUNG SHAN WU XIANGQIAN WU DAVID WUERTZ ANGELA WYATT JAMES YOE SHAROLYN YOUNG CARL YOWELL STEVEN ZEGALIA RAYMOND ZEHR CYNTHIA ZEIGLER HUAI MIN ZHANG CHENG ZHI ZOU

THE PEOPLE OF NESDIS



NESDIS 2002 ANNUAL REPORT